

## SHORTENING ACQUISITION CYCLE TIMES, MAKING SCHEDULE A KEY PERFORMANCE PARAMETER

BY

COLONEL DANNY A. WILEY  
United States Army

### DISTRIBUTION STATEMENT A:

Approved for Public Release.  
Distribution is Unlimited.

USAWC CLASS OF 2010

This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.



U.S. Army War College, Carlisle Barracks, PA 17013-5050

| Report Documentation Page  |                                    |                                     | Form Approved<br>OMB No. 0704-0188 |  |                                 |
|--|------------------------------------|-------------------------------------|------------------------------------|--|---------------------------------|
| Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. |                                    |                                     |                                    |  |                                 |
| 1. REPORT DATE<br><b>30 MAR 2010</b>   |                                    | 2. REPORT TYPE                      |                                    | 3. DATES COVERED                         |                                 |
| 4. TITLE AND SUBTITLE<br><b>Shortening Acquisition Cycle Times, Making Schedule a Key Performance Parameter</b>  |                                    |                                     |                                    | 5a. CONTRACT NUMBER                      |                                 |
|  |                                    |                                     |                                    | 5b. GRANT NUMBER                         |                                 |
|  |                                    |                                     |                                    | 5c. PROGRAM ELEMENT NUMBER               |                                 |
| 6. AUTHOR(S)<br><b>Danny Wiley</b>   |                                    |                                     |                                    | 5d. PROJECT NUMBER                       |                                 |
|  |                                    |                                     |                                    | 5e. TASK NUMBER                          |                                 |
|  |                                    |                                     |                                    | 5f. WORK UNIT NUMBER                     |                                 |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)<br><b>U.S. Army War College ,122 Forbes Ave.,Carlisle,PA,17013-5220</b>   |                                    |                                     |                                    | 8. PERFORMING ORGANIZATION REPORT NUMBER |                                 |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  |                                    |                                     |                                    | 10. SPONSOR/MONITOR'S ACRONYM(S)         |                                 |
|  |                                    |                                     |                                    | 11. SPONSOR/MONITOR'S REPORT NUMBER(S)   |                                 |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT<br><b>Approved for public release; distribution unlimited.</b>   |                                    |                                     |                                    |  |                                 |
| 13. SUPPLEMENTARY NOTES  |                                    |                                     |                                    |  |                                 |
| 14. ABSTRACT<br><b>see attached</b>  |                                    |                                     |                                    |  |                                 |
| 15. SUBJECT TERMS  |                                    |                                     |                                    |  |                                 |
| 16. SECURITY CLASSIFICATION OF:  |                                    |                                     | 17. LIMITATION OF ABSTRACT         | 18. NUMBER OF PAGES<br><b>32</b>         | 19a. NAME OF RESPONSIBLE PERSON |
| a. REPORT<br><b>unclassified</b>   | b. ABSTRACT<br><b>unclassified</b> | c. THIS PAGE<br><b>unclassified</b> |                                    |  |                                 |

The U.S. Army War College is accredited by the Commission on Higher Education of the Middle State Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

# **PROPERTY OF U.S. ARMY**

USAWC STRATEGY RESEARCH PROJECT

## **SHORTENING ACQUISITION CYCLE TIMES, MAKING SCHEDULE A KEY PERFORMANCE PARAMETER**

by

Colonel Danny A. Wiley  
United States Army

Colonel Stephen P. Weiler  
Project Adviser

This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

U.S. Army War College  
CARLISLE BARRACKS, PENNSYLVANIA 17013

## **ABSTRACT**

AUTHOR: Colonel Danny A. Wiley

TITLE: Shortening Acquisition Cycle Times, Making Schedule a Key Performance Parameter

FORMAT: Strategy Research Project

DATE: 19 March 2010      WORD COUNT: 6,985      PAGES: 32

KEY TERMS: Program Management, Acquisition Process

CLASSIFICATION: Unclassified

Fielding weapon systems in a timely manner has been criticized for decades by congress. Recent years have seen serious erosion in the ability of the Department of Defense to field new weapons systems quickly in response to changing threats, as well as a large increase in the cost of these weapons systems. Acquisition reforms continue to take hold yet there is no evidence of shorter weapon system cycle times which gets the weapon system to the warfighter faster and inherently controls costs. To increase the likelihood of achieving reduced weapon system cycle time the Army should adopt a schedule key performance parameter (KPP) for weapon systems. This would serve as disruptive change to the acquisition process. This emphasis on absolutely meeting the warfighters need date would drive the acquisition community to sign up for less risky schedules which then would drive stable cost and performance estimates at the onset of a program. The net result of this change would reduce acquisition cycle times with a corresponding potential increase in technology development outside of the Acquisition community.

## SHORTENING ACQUISITION CYCLE TIMES, MAKING SCHEDULE A KEY PERFORMANCE PARAMETER

In June 2009 William J. Lynn II, Deputy Secretary of Defense, addressed the shortcomings of the Department of Defense (DOD) acquisition system: “American taxpayers and our men and women in uniform are understandably skeptical when they hear promises to reform the acquisition system within the Department of Defense, which often delivers major weapons systems to our soldier’s years behind schedule and billions of dollars over budget. Like Mark Twain’s famous observation about the weather, it seems everybody talks about it, but nobody does anything about it.”<sup>1</sup>

DOD knows what to do to improve the success rate of delivering weapon systems on time and on budget, DOD invested a significant amount of time investing in studies, received recommendations from reports, and heard the criticism of congress. DOD continues to add to their historical track record of having difficulty applying the controls or assigning the accountability necessary for successful outcomes. The Government Accountability Office (GAO) has published numerous reports over the past 10 years identifying shortfalls in the acquisition process, citing statistics of increased costs and schedule overruns of DOD weapon system programs and made recommendations on how to improve these areas of concern.

Fielding weapon systems in a timely manner has been criticized for decades by our political leadership. Former President Ronald Reagan stated “The past erratic patterns of funding for our national defense that we have sought to avoid are again a reality, resulting in program stretch-outs, increased acquisition costs, and instability in defense planning.”<sup>2</sup> The decades of criticism and studies have lead to much rhetoric on

the subject and yet the DOD track record for delivering capability on original schedule and cost estimates continues to fall short.

The 1986 President's blue ribbon commission report titled "A Formula for Action" stated "An unreasonably long acquisition cycle -- 10 to 15 years for our major weapon systems...is a central problem from which most other acquisition problems stem..." It continued "Too many of our weapons systems cost too much, take too long to develop, and, by the time they are fielded, incorporate obsolete technology." Yet despite the decades of reform initiatives and hundreds of commissions and studies, DOD weapon systems continue to incur unreasonably long acquisition cycles. <sup>3</sup>

In March 2008 a GAO assessment of 72 DOD weapons programs found total acquisitions costs were greater than 25% higher than first estimates, and on average 21 months late in delivering just the initial capabilities to the warfighter. The programs assessed--most of which are considered major acquisitions by DOD--were selected using several factors: high dollar value, acquisition stage, and congressional interest. This assessment conducted annually was the sixth and GAO said the Pentagon "is not receiving expected returns on its large investment in weapon systems. Our analysis does not show any improvements in acquisition outcomes as programs continue to experience increased costs and delays in delivering capabilities to the warfighter. In fact, when compared to the performance of the fiscal year 2000 portfolio of major defense acquisition programs, cost and schedule performance for current programs is actually worse."<sup>4</sup>

"Unfortunately, our review this year indicates that cost and schedule outcomes for major weapon programs are not improving over the 6 years we have been issuing

this report. Although well-conceived acquisition policy changes occurred in 2003 that reflect many best practices we have reported on in the past, these significant policy changes have not yet translated into best practices on individual programs. Flagship acquisitions, as well as many other top priorities in each of the services, continue to cost significantly more, take longer to produce, and deliver less than was promised,” the 2008 GAO report said.<sup>5</sup>

All service acquisition school program management courses center around a common theme of success for leaders in the acquisition community. Program managers must make sound decisions to ensure a program meets established cost, schedule and performance thresholds resulting in delivery of a product. In the commercial world, successful companies have no choice but to succeed at delivering products or they go out of business. These companies must produce realistic cost and schedule estimates, and deliver products to customers at the right price, the right time, and the right cost. Shareholders and Boards of directors also receive feedback in the form of detailed reports that outline the financial health of the company as well as the prospect for future success. At first glance, it would seem DOD’s definition of success would be very similar: deliver capability to the warfighter at the right time within cost constraints. However, this is not happening within DOD.

Examining the weapons in today’s Army to realize the acquisition process has produced superior weapons. The M1 Abrams entered U.S. service in 1980 and proved to be the superior tank during Desert Storm. The United States Air Force B2 stealth aircraft is an example of a superior bomber aircraft among numerous aircraft that have proven to provide U.S. air superiority for decades. The B2 stealth bomber originally



designed in the 1980s for Cold War operations scenarios, have been used in combat to drop bombs on Serbia during the Kosovo - Serbia Conflict in the late 1990s, and saw continued use during the ongoing wars in Iraq and Afghanistan.

The current norm of costs exceeding planned expenditures, and system being fielded later than originally planned reduce the buying power of the defense dollar, delay capabilities for the warfighter, and force unplanned—and possibly unnecessary—trade-offs in desired acquisition quantities. Such trade-offs create an adverse ripple effect among other weapons programs or defense needs because of the need to make tradeoffs which result in choices to cut one program to make up the shortfalls in another program deemed more important. Because of the lengthy time to develop new weapons, many enter the field with outdated technologies. Delays in planned fielding's result in a reliance on legacy systems that remain in the inventory for longer periods, requiring greater operations and support cost that pull funds from other accounts, including modernization.<sup>6</sup> Ultimately the risks caused by increased costs and schedule delays result in our warfighters not having the capability at the time that was determined to be essential when program timelines were established at the onset of a weapon system program.

The amount of time it is taking to produce and field our equipment has only grown over the years yet the environment we face as a military has changed rapidly. “Today the military’s programs for developing weapons systems take two to three times longer to move from program initiation to system deployment than they did 30 years ago. This slowdown has occurred during a period in which threats have been changing more rapidly than ever and when technology advances and accumulated experience

should have been accelerating rather than slowing the development process.<sup>7</sup> The added time to develop and field a system is affecting all of the services ability to modernize the force. The late arrival of weapon systems not only reduces our ability to exploit the advantage of the increased capabilities of the weapon but also causes the services to extend the service life of the legacy systems. This results in the services approving the new weapon programs schedule, adding to program costs, while also spending money on extending the service life of the legacy weapon system. In most cases the resources to address these issues cause another service program or initiative to receive less funding in order to fund the program schedule slip and service life extension. The result often causes the billpayer programs to also slip schedule. The wear and tear on the equipment is taking in Iraq and Afghanistan make the modernization shortfalls even more critical.

Reviews of defense procurement programs highlights the same issues - unrealistic cost estimates, unrealistic timelines, and plans built on technologies that aren't quite ready to meet the original schedule estimates. This was recently the case with the Army's Future Combat Systems (FCS), in which much of the technology that was the foundation for the entire program remained in design and development causing schedule to slip. This led to the cancellation of major portions of the FCS program. Rep. Neil Abercrombie, D-Hawaii, chairman of the committee's air and land forces panel recommended cuts to FCS and cited schedule as one of the factors in his recommendation: "It is \$110 billion over budget and five years behind schedule," he said. "I hardly think they have been cut short. And, it has not produced a single deployable system in six years of development."<sup>8</sup>

Katherine V. Schinasi, Managing Director Acquisition and Sourcing Management testified before the U.S. Senate in 2005 and recapped the history of rising costs and increased delays in DOD weapon system acquisitions: “The persistent nature of acquisition problems has perhaps made decision makers complacent about cost growth, schedule delays, and quantity reductions in weapon system programs.”<sup>9</sup> Decision makers have become accustomed to acquisition programs consistently missing the cost and schedule milestones as it has become the norm throughout their tenure.

The Business Executives for National Security (BENS) is a nationwide, non-partisan organization, through which senior business executives can help enhance the nation's security. BENS reports to have one special interest: to help make America safe and secure.<sup>10</sup> In July 2009, the BENS published a study on acquisition reform that opened with a story about a fictitious program and the many factors contributing to cost growth, schedule delays, and quantity reductions in weapon system programs. The story allows the reader to understand the acquisition environment and factors. It begins with the requirement process which leads to the need for a program to develop and field a capability.

“A group of individuals who served their country with distinction in combat is assigned to define requirements for the next generation of a much-needed item of military equipment. Wanting to assure success for U.S. and allied forces in any future conflict and knowing that the item must perform for many years, the group establishes demanding requirements.”<sup>11</sup> At this point in the process, in the army, a requirements document is published and handed off the acquisition professionals.

The requirements document drives the acquisition community to take the dissect each requirement and create a document suitable for use in negotiations with a defense contractor. Ultimately, after consulting with the warfighter to ensure clarity, a request for proposal is generated to solicit an industry solution with the appropriate cost and schedule estimates to reach the first milestone. A simple example of a derived requirement would be the requirements document stating the weapon must be transportable on a Navy ship which would evolve to requirements for maximum height, weight and saltwater environment corrosion standards. The request for proposal contains not only the system requirements but additional data to define the entire scope of the work to be performed such as import restrictions and government auditing privileges.

“Intense but healthy competition ensues among contractors seeking to develop and produce the new item, each needing to win the contract due to the immense pressures of the financial markets in which defense firms, operating in a monopsony, must vie against purely commercial firms for shareholders and access to debt. Each bidder is optimistic that its attractive cost and schedule estimates will win the work. A winning contractor is finally selected by the government, but must endure a one-year delay before beginning work while protests submitted by losing bidders—each of which finds in the labyrinthine Request for Proposal what they believe to be legitimate reasons they should have won instead—are resolved.”<sup>12</sup> It is not an accepted practice to build in extra schedule to allow for protest delays as that would be akin to planning for failure but the reality is on high cost weapon system programs, protests are the norm as each

defense contractor bidding does so at their own expense and enters into the competition to win from the onset.

“Work on the project finally begins, but within a year the Program Manager discovers that the technology needed to meet the established requirements is not yet fully available. Congress had previously declined to appropriate contingency funds for the contract or to pay for schedule slack, so it takes nearly two years to obtain additional resources to bring the technology to maturity. The Program Manager reluctantly proposes a schedule slip—even though this will substantially raise overall costs because of the need to keep the physical plant open and the personnel associated with the project on payroll for a longer time. The senior Defense Department executives overseeing the acquisition process, many of whose positions will be occupied for only a few years by individuals with limited on-the-ground R&D management experience, approve the schedule change.”<sup>13</sup> Technology maturity is often cited as a major obstacle in meeting planned schedule estimates. To begin an acquisition program the technology has to be deemed mature enough or expected to mature outside of the acquisition process (an example would be expecting the computer processing speed to increase). When a program experiences such a delay the programs cost, schedule and performance estimates are at greater risk.

“As the development effort stutters and stalls, unforeseen new military threats force modifications in the original requirements for the piece of equipment. It soon becomes apparent that the projected unit cost of the item is significantly underestimated, an outcome exacerbated by unrealistic inflation-rate estimates dictated by the Office of Management and Budget. Senior acquisition managers therefore decide

to halve the total number of items to be produced; to reduce the test program; to eliminate the reliability growth program; and to defer the purchase of spare parts and training equipment.”<sup>14</sup> As programs slip often the original requirements document become questionable, if not obsolete. The requirements authors determined their needs based on the threat they envisioned when the weapon system was to be fielded. Changes in requirements force changes in contracts and often cause a need to repeat a lot of work that had been done. An example would be adding an armor capability to a vehicle which has impacts on the entire vehicles design based on the added weight. To counteract a lack of funding often services will reduce the amount of items to be produced to harness the difference and also eliminate other parts of the program assuming a risk in those areas. Though counterintuitive, this results in added risk throughout the program setting up a high probability of continued schedule delays.

“Having been in place so long as to jeopardize his military career, the Project Manager moves on and a replacement assumes the position.”<sup>15</sup> In the Army a program manager serves 3 or 4 years which is established up front. There is little flexibility in extending the tenure of a program manager as replacements are identified by a selection board and slated for a program a year out. Program managers then typically move to key positions on the Army, DOD or Joint Staff and are looked at by flag officer selection boards. The next key leadership position that follows a program manager job is being selected as a Program Executive Officer, a flag level position, who oversees a portfolio of programs.

“Seeking to prevent such problems from recurring, a chastened acquisition bureaucracy establishes new regulations, policies and oversight to better monitor and

control future activities, large and small. Seeing this, some politicians who had questioned the need for the project at its outset, and had doubted its eventual success, seize on a new opportunity to reduce further the production buy. Understandably frustrated with the program's progress, Congress also imposes several additional stipulations, reviews and controls, some of a detailed technical nature."<sup>16</sup>

As a consequence of these developments, unit costs skyrocket further due to the now over-capacity production line that had been constructed, the low rate of production, the need to amortize fixed costs over a significantly smaller procurement buy, the need to renegotiate thousands of subcontracts due to schedule changes, the demand for additional reports and reviews, and the inability of the factory to take full advantage of the learning-curve benefits of larger, more rapid and more stable procurement processes. Unit costs also increase because the law stipulates that most component parts be purchased in one-year increments rather than in larger, more cost-effective lots."<sup>17</sup> Typically when production costs are established it is based on quantity. Because most major weapons systems involve costly advanced technologies and investments in factories and workers, and have no commercial market, contractors often build or refurbish production plants for the specific system to be produced. This occurs years prior to production for major weapon systems. The contractor plans for the production and has to procure facilities and labor based on expected number of systems that will be produced in any given year. As such when the government decides to cut production the cost of each item increases based having to absorb the costs already expended. A well laid plan based on maximizing efficiencies for a defined set of items to be produced becomes inefficient and in many cases can lead to delays in schedule. 0An example

would be the need for a contractor to have gaps in production based on the fiscal reality that they cannot produce consistently based on the reduced quantities.

“While the program has slowed, been diminished and grown more expensive, additional demands on the overall government budget emerge, some due to unforeseeable events and some due to cost overruns in other government programs, both military and civil. There is now significantly less money available for the production program than had originally been hoped (no overall assessment or projection of affordability had been conducted during the initial requirements process), so production is further curtailed as to both rate and quantity. The media begin quoting the unit cost as a fraction of GDP.

The troubled program is finally terminated due to widespread sticker shock, even though the equipment being developed is—belatedly—performing up to and even beyond requirements. Everyone involved with the program is shocked that this could have happened, even though it has happened to program after program for more than fifty years.

The contractor is lucky to break even, and program termination drives experienced personnel away from the defense industry. Meanwhile, the military officers who served as requirements generators return to their field assignments where they prepare their troops to go into combat with 40-year-old equipment. At the onset military professionals are assigned to define requirements for the weapon systems of tomorrow. Wanting to assure our soldiers receive a system that will prevail in any future conflict and knowing that the item will remain and perform for the warfighter for decades these professionals establish demanding requirements.”<sup>18</sup> The story ends with a cancelled



program and the original requirements authors returning to a combat unit with obsolete equipment. The initial requirements are not the issue. Requirements ultimately end up in the hands of an acquisition professional who must determine if they can be met and if so, at what cost and on what schedule. This process not only involves soliciting the experts within DOD but also industry for their proposal to meet the requirements. DOD should improve estimating the time it takes to meet the requirements. Better estimating in the case of this fictitious story might have lead DOD to not pursue the program to begin with or to pursue the program on a longer timeline upfront. What if the immature technology had been forecasted for? Perhaps that would have led to not pursuing the program until later when technology was mature enough which would have prevented the program from starting on the wrong footing.

As the story above depicted, programs experience a lot of challenges and problems along the way. These problems create slips in schedule and ultimately increase acquisition cycle time which is the time it takes an acquisition program to field all of the systems to the warfighter. These increases in cycle time run up the costs even more and American taxpayers ultimately are not getting our money's worth. More importantly is the other group who loses out from delays: soldiers. Executing a program within the DOD process is challenging. In the same report cited earlier, the BENS identify some of the challenges within the process: "The acquisition process is actually not a unified process: It better resembles a collection of band-aids layered over each other, each designed in its time to solve some specific problem, none undertaken in consideration of its eventual impact on the acquisition functions as a whole. Defense acquisition revolves around 15-year programs, 5-year plans, 3-year management, 2-

year Congresses, 18-month technologies, 1-year budgets, and thousands of pages of regulations.<sup>19</sup> This creates a challenge for delivering weapon systems on cost and schedule but is a known reality to the acquisition professional and the warfighting leadership that establish program timelines and allocate resources to deliver weapon systems to the force.

Within DOD the interaction of the three-key processes must work in concert to deliver the capabilities required by the warfighters: the requirements process (Joint Capabilities Integration & Development System [JCIDS]); the acquisition process (Defense Acquisition System); and program and budget development (Planning, Programming, Budgeting, and Execution [PPBE] process). Making changes at a level encompassing these three systems to reduce acquisition cycle times is out of the scope of influence of most, but achieving cycle time reductions within requirements process by implementing a Schedule Key Performance Parameter (KPP) is a step in the right direction towards improving the acquisition system process. The requirements process feeds the acquisition process which depends upon the budget process to resource the programs.

A Schedule Key Performance Parameter (KPP) would be documented in the Acquisition Program Baseline (APB). Every weapon system program of record has an APB. This APB is a contract between the Program Manager and the leadership that has made a decision to resource a weapon system program. Once a weapon system is an established program of record, the Program Manager can begin the various activities needed to develop, test, and ultimately field a system knowing that the program is fully funded in accordance with the APB. Ultimately the baseline is centered on delivering a

weapon system that must meet the KPPs prescribed in the requirements documents. KPPs are the minimum attributes or characteristics considered most essential for an effective military capability.<sup>20</sup>

A KPP normally has a threshold, representing the required value, and an objective, representing the desired value. KPPs, as well as all of the other system requirements, are contained in the Capability Development Document (CDD) and the Capability Production Document (CPD). These documents are developed and approved by the requirements community and handed off to the acquisition community for execution. KPPs are included verbatim in the APB.

Two examples of mandatory KPPs for today's army acquisition programs are the Net Ready KPP (NR-KPP) and the Survivability KPP. The NR-KPP, in short, verifies compliance with DOD information assurance and exchange requirements. The Survivability KPP, in short, requires systems to design in force protection and survivability when such systems may be employed in a threat environment.<sup>21</sup>

Weapon systems programs must meet every KPP requirement contained in the CDD and CPD. However, numerous other requirements — whether a KPP or not—must be met. The Chief of Staff of the Army (CSA) is the requirements document approval authority for the Army.<sup>22</sup> This level of accountability ensures that any change to any requirement has the highest of visibility within the Army.

Many factors contribute to the lengthy weapon system cycle time. Some of the more notable contributors include: Trying to achieve revolutionary but unachievable capability, not allowing technologies to mature in the science and technology base

before bringing them into programs, and ensuring that requirements up front are well-defined and doable along expected timelines.

Current efforts do continue to reform our processes. The Weapon Systems Acquisition Reform Act (WSARA) (formally Weapons Acquisition System Reform Through Enhancing Technical Knowledge and Oversight Act of 2009) was an Act of Congress passed in 2009 that was created to reform the way the Pentagon contracts and purchases major weapons systems. The bill was signed into law on May 22 by President Barack Obama. Senator Carl Levin stated: “Report after report has indicated that the key to successful acquisition programs is getting things right from the start with sound systems engineering, cost-estimating, and developmental testing early in the program cycle. Over the last twenty years, however, DOD has eliminated acquisition organizations and cut the workforce responsible for taking these actions, and has tried to “reform” the acquisition process by taking shortcuts around early program phases in which these actions should be taken. The result has been excessive cost growth in weapon systems and excessive delays in fielding those systems”<sup>23</sup> The legislation created a Pentagon office that analyzes the cost of new programs and reports directly to the Secretary of Defense. WSARA puts more emphasis on testing new weapons before they enter production to ensure sufficient development, giving commanders more say in weapons requirements. Whether or not this reform will reduce weapon system cycle time remains to be seen. Over the decades, congressional oversight has focused on many aspects of the acquisition process and in response to these concerns, Congress has legislated many changes in an effort to improve the defense acquisition structure and its practices.<sup>24</sup>

With a keen eye on the track record of reforms so far, what can be done now to reduce weapon system cycle time? A potential answer is to elevate the schedule established in the APB as a KPP. This would ensure that any change to schedule, resulting in a change to weapon system cycle time, would have the visibility of our senior leadership and congress since DOD policy dictates that Congress be notified of intent to change a KPP.<sup>25</sup>

Since the weapon system APB has cost, schedule and performance thresholds the schedule is a known requirement up front and easily could be recorded as a KPP. Having a schedule KPP is not a new concept, on June 7, 2005, Gordon England, Acting Deputy Secretary of Defense, authorized an assessment of the Defense Acquisition System, and created a panel to carry out a Defense Acquisition Performance Assessment (DAPA) report. Making (schedule) a KPP for the acquisition programs was among the panel's recommendations.<sup>26</sup> As of this writing, there has been no indication that schedule will emerge as a KPP. The requirements community would define the need date upfront and make it a KPP and pass this to the acquisition community. Adopting schedule as the cornerstone requirement would serve as a disruptive change to the acquisition process. This emphasis on absolutely meeting the warfighters need date would drive the acquisition community to execute programs with less risky schedules which then would drive stable cost and performance estimates at the onset of a program. The net result of this change would reduce acquisition cycle times.

The likelihood that any schedule estimates are met would vary depending on program complexity. Cost and schedule estimation in the presence of technology risks is difficult for various reasons. Such risks would be less likely to be with the elevation of

schedule as a KPP. This change should force programs to only be initiated once the technical performance risk is such that established schedule KPP is low risk. This could solve some of the scrutiny of immature technologies being adopted at program initiation (milestone B). An example of such scrutiny is the 2007 Defense Acquisition Performance Assessment which stated: "...there are no clearly definable measures of technology readiness, and the inability to define and measure technology readiness during technology readiness assessments is the reason that immature technology is incorporated into plans prior to milestone B."<sup>27</sup>

Ideally, since KPPs are established at program initiation, a schedule KPP would force programs to become programs of record only when all the current technology risk levels are determined to be acceptable allowing the program to be on hard time constraints. Initiating programs of record built on technologies that are not ready for development is nothing new. This was recently the case with the Army's Future Combat Systems, in which a GAO investigation found the technology that was the foundation for the entire program still in design and development.<sup>28</sup>

An example of current initiatives that reduce technology risk prior to the initiation of a program of record is an increased focus on Milestone A and the Utilization of Prototyping. Milestone A is the phase of acquisition that takes place prior to a program being formally stood up as a program of record. The Joint Light Tactical Vehicle (JLTV) Program is an example of increased focus on Milestone A and utilizing prototyping in preparation for Milestone B (Initiation of a Program of Record) decision making. Prototyping provides insight for performance, cost, manufacturability, integration and testing. Design reviews, drawing releases, bills of material, assembly documentation

and basis for cost and schedule estimates, from components to systems are enabled utilizing early and competitive prototyping. If these efforts are done upfront before program initiation the result is a decrease the technology development risk at Milestone B. These efforts would contribute to the ability of establishing a realistic schedule KPP by virtue of the increased awareness of the art of the possible. At the onset, programs would match the schedule KPP timeline with all of the programmatic tasks necessary to meet the milestone for entry into the next phase of acquisition.<sup>29</sup>

If a schedule KPP were to be implemented it would have ramifications on the Joint Capabilities Integration and Development System (JCIDS). The Joint Requirements Oversight Council (JROC) oversees the JCIDS, and supports the Defense Acquisition Board (DAB) by validating KPPs prior to each DAB review of Major Defense Acquisition Programs (MDAPs) (including, unless otherwise directed by the Secretary of Defense, highly sensitive classified programs). The procedures established in the JCIDS support the chairman of the Joint Chiefs of Staff and the JROC in identifying, assessing, and prioritizing joint military capability needs. As such, given the JROC reviews each KPP, this same body would also approve the required timeline (schedule KPP) alongside all other KPPs.

Key Performance Parameters (KPPs) are introduced in the CDD. The CDD, which supports programs of record, supports Milestone B which is the phase of acquisition where the system is further developed. The CDD identifies operational performance attributes of the proposed system. The CDD is system specific and applies to a single increment of capability in an evolutionary acquisition program. A schedule

KPP would be the required timeline to develop the capability required to proceed into the next phase.

Once development is completed the CDD is replaced by the CPD. The CPD contains KPPs and supports Milestone C which is the phase of acquisition that leads to production and fielding. The CPD is the document that addresses the production elements specific to a single increment of an acquisition program. A schedule KPP would be the required timeline to produce and field a system to the warfighter.

It is important to note that programs already have numerous decision points that reside within each phase of acquisition. Every weapon system is planned to meet cost, schedule and performance requirements. Once programs are initiated there are three types of decision points: milestones, decision reviews, and a design readiness review. Each decision point results in a decision to initiate, continue, modify, or terminate a project or program work effort or phase. Each has a timeline the program manager establishes. Higher level reviews typically involve leadership throughout the service. Within the Army are capability portfolio managers that oversee the programs and products being developed within capability domain. The review associated with each decision point will typically address program progress, risk, affordability, supportability, program tradeoffs, acquisition strategy updates, and the development of exit criteria for the next phase or effort. The type and number of decision points is tailored to program needs. Incorporating a schedule KPP would increase the weapon systems schedule oversight and elevate the need to complete all of the required actions necessary within the specified required timeline of the warfighter.



Determining what the schedule KPP is at each phase is not a simple task. At all stages, but in particular early on, a program relies on technology to be developed and incorporated in the design to meet the requirements. “Fred Brooks pointed out an important and frequently overlooked fact in his classic book *The Mythical Man-Month* that when a task cannot be partitioned because of sequential constraints, the application of more effort has no effect on the schedule. In terms of technology development, the process is inherently a sequence of learning steps, building on the results of previous experiments. This sequential process of experimentation and learning, combined with the probabilistic nature of success, make the implementation of schedule KPP very problematic if the development of technology is left to a program.<sup>30</sup>”

So where then does the technology get developed if not within the program? DOD has a robust Science and Technology (S&T) base that provides the research and development base for the desired future capability. Private industry also has robust research and development resources that allow them to experiment and come up with new ideas to demonstrate an ability to be at the leading edge of technology. Ideally this is where technological risks are vetted versus the current trend of a failure to identify technical issues, as well as real costs, within a program of record. Given that technological challenges are the overwhelming cause for subsequent schedule delays and the resulting cost increases it makes sense that these be vetted in the S&T base. This increases the likelihood that programs could be accountable to a schedule KPP based on the technology being more mature. Programs of record would be less likely to experience the development problems that lead to schedule slips. Thus a schedule KPP would likely delay the start of formal programs of record until the requirements, which

rely on the technology, are able to be met within time constraints. The acquisition community is under constant pressure to deliver capabilities quickly so delaying the start of programs could be met with resistance. More often than not this scrutiny is due to the programs not meeting the original schedules developed and communicated to the warfighter. The schedule KPP would be defined by the warfighter up front and approved prior to a program initiation. The process of developing requirements is a warfighter function but the acquisition community is involved and consulted throughout this process which would ensure expectations were managed. The Army has a way to circumvent the traditional acquisition process for urgent operational needs. A recent development inside the Army, the stand up of a Rapid Equipping Force (REF), allows for urgent operational needs to be satisfied with a solution quickly. The solution is not the ideal solution which meets all of the requirements for an enduring capability like the various reliability, survivability and lethality characteristics, but it does provide an ability to field a solution quickly with known risks. REF programs are not subject to a requirements document and typically are for short term needs that may not necessary replace an existing capability or be expected to be in the force for a long time. Typically REF programs are driven by a need inside a theater of operations. Often these programs, like the Mine Resistant Armored Protection (MRAP) vehicle, prove to not only address a need fast but also prove out some of the technology needed to transition the system into the formal acquisition process. REF efforts, along with the S&T community would be relied on to increase the confidence of establishing a schedule KPP for acquisition programs.

Shorter development cycles inherently control costs as it is easier to estimate costs accurately, and then predict funding needs and allocate resources effectively. From the budgetary lens such a statement is appealing. However, it is important to note reducing the weapon system cycle time, delivering a product to warfighters quicker, but leaving them with a system that 1) does not meet performance expectations; 2) cannot be easily maintained; or 3) cannot be improved when the threat changes, is not the intent of instituting a schedule KPP. The intent of this policy change is to force programs to be set up to achieve the cycle time expected by our senior leaders at the onset versus the current reality of cycle times slipping. Schedule is not currently a KPP or requirement for weapon system programs in a true sense, programs are established and funded for an amount of time spelled out in the APB which translates into the expected timeline but this is not on equal footing with the system requirement drivers (KPPs).

Three alternatives exist to implement a schedule KPP: 1) Make the weapon system schedule KPP mandatory, 2) Make the weapon system schedule KPP the only mandatory KPP, and 3) Make the weapon system schedule KPP the only KPP.

Making the weapon system schedule KPP mandatory for all weapon system programs ensures schedule has the same degree of importance as the other currently mandated weapon system KPPs. The schedule for programs would have top level visibility to include oversight by congress. A disadvantage is the schedule KPP would reside among the other mandatory, equally important, KPPs and thus it would not elevate schedule as the cornerstone requirement for weapon systems programs.

Making the schedule KPP the only mandatory KPP for weapon systems would have all the positive aspects in the previous alternative but this would elevate schedule, the only mandatory KPP, as the most important requirement. It would also increase the emphasis on development of capability outside of formal acquisition programs. DODs robust S&T base and RDECOM would continue to provide the research and development base for the desired future capability. A disadvantage is the schedule KPP would likely still be surrounded by many other KPPs. Acquisition programs are subject to diverse communities that inherently are always trying to ensure their requirement is a KPP, regardless of if it is mandated, for the obvious reason that KPPs are the highest priority.

Making the schedule KPP the only KPP for weapon systems shares the other positives outlined in the previous alternatives but this forces all efforts to center around getting the weapon system into the hands of the warfighter. It establishes our commitment to delivering on time to the warfighter as the cornerstone requirement and sole KPP, subject to the highest oversight (congress), for our programs. A disadvantage would be the perception created when we eliminate all other KPPs. KPPs are not the only requirements for a program. Every requirement in the CDD and CPD must be met and it is not within a program manager's purview to change a requirement. Any changes to requirements must be vetted with the requirements community and approved.

In conclusion all of the alternatives contribute to our ability to field weapon systems in a timely manner. Change is needed given the reality that our acquisition community is under increased scrutiny for not delivering weapon systems on time. We have had decades of criticism and our community needs a change that is loudly heard.

Making the schedule KPP the only KPP for weapon systems, provides the hardest hitting approach to a focus on meeting schedule and shortening weapon system cycle time. It is a realistic option and actionable. This policy change does not eliminate any requirement for any weapon system. All requirements levied from across the communities to ensure a system is in fact suitable, safe and able to counter the threats would still exist. The currently mandated Survivability KPP and the NR-KPP discussed earlier would still be documented requirements that are funded and a part of the APB. What this alternative does is raise the stakes on our acquisition community to deliver on time, and as such the community would need to adapt and ensure the program up front is focused on delivering a system that meets all requirements on time.

Support for this idea would be mixed. The industrial base would see a drop in the length of their developmental contracts that are the desired multiyear type inside an acquisition program but would see a rise in the amount of short term technology development from the DOD S&T base as the S&T base takes on the task of maturing technology beyond their current practice. The requirements community would likely embrace this idea but also be hesitant to eliminate all of the other KPPs. Perception would be that the currently mandated KPPs are no longer critical. Such resistance could be curtailed by ensuring those former KPPs, which would still be requirements, have the oversight by the organizations that managed them as KPPs. The acquisition community would embrace this concept on the grounds that it increases the likelihood of execution to the original baseline. Many of the current reasons for schedule slips, like taking on immature technology, would be vetted out at the beginning. Increasing the maturity of technology prior to program initiation would lead to realistic schedule estimations.

Currently when programs face unforecasted technological risks which lead to schedule slips the impact is on warfighter, who waits longer to receive the system, and the services who face the challenge of resourcing above the forecasted levels. Many times this funding comes from another program which then faces the challenges of reduced resources. The budget community would embrace this idea as it would increase the funding stability across programs.

The highest priority for a program manager should be to deliver in accordance with the warfighters schedule requirement. A schedule KPP would put an emphasis on schedule estimating capabilities, in particular emphasizing the need for high confidence schedule estimates at the onset of a program. Failure to meet a KPP or requests to change a KPP must be communicated and subject programs to termination. In implementing the new policy, the Army would begin to require programs to communicate schedule risk and uncertainty up front and only embark on creating a new program when such risk is acceptable.

## Endnotes

<sup>1</sup> William J. Lynn III, *"Spending in a way that better helps our troops," Washington Times*, June 4, 2009.

<sup>2</sup> Ronald Reagan, "Statement on Signing the National Defense Authorization Act for Fiscal Year 1987," November 14, 1986, <http://www.reagan.utexas.edu/archives/speeches/1986/111486i.htm> (accessed November 12, 2009), 1

<sup>3</sup> President's Blue Ribbon Commission on Defense Management, "A Formula for Action, A Report to the President on Defense Acquisition," April 1986, <http://www.ndu.edu/library/pbrc/36ac7c2.pdf> (accessed September 2009), 8

<sup>4</sup> U.S. Government Accountability Office, *Defense Acquisitions Assessments of Selected Weapon Programs: Report to Congressional Committees*, (Washington, DC: U.S. Government Accountability Office, March 2008), 3

<sup>5</sup> *Ibid*, 4

<sup>6</sup> U.S. Government Accountability Office , *Better Acquisition Outcomes Are Possible If DOD Can Apply Lessons From F/A-22 Program*, (Washington, DC: U.S. Government Accountability Office Best Practices, April 2003), 6

<sup>7</sup> Ibid, 7

<sup>8</sup> Rick Maze, "House committee votes to cut FCS money," 2008, [http://www.armytimes.com/news/2008/05/military\\_army\\_mraps\\_051408w](http://www.armytimes.com/news/2008/05/military_army_mraps_051408w) (accessed February 19, 2010), 1

<sup>9</sup> U.S. Government Accountability Office, *DOD Acquisition Outcomes A Case for Change: Testimony Before the Subcommittee on AirLand, Committee on Armed Services, U.S. Senate*, (Washington, DC: U.S. Government Accountability Office, November 2005), 1

<sup>10</sup> Business Executives for National Security home page, <http://www.bens.org/home.html>, (accessed February 20, 2010), 1

<sup>11</sup> Business Executives for National Security, "A Business Imperative for Change from the Task Force on Defense Acquisition Law and Oversight," July 2009, [http://www.bens.org/mis\\_support/Reforming%20the%20Defense.pdf](http://www.bens.org/mis_support/Reforming%20the%20Defense.pdf) (accessed December 5, 2009), i

<sup>12</sup> Ibid i

<sup>13</sup> Ibid i

<sup>14</sup> Ibid i

<sup>15</sup> Ibid i

<sup>16</sup> Ibid i

<sup>17</sup> Ibid i

<sup>18</sup> Ibid i

<sup>19</sup> Ibid 1

<sup>20</sup> U.S. Department of the Army, *Research, Development, and Acquisition Army Acquisition Policy*, Army Regulation 70-1 (Washington, DC: U.S. Department of the Army, December 31, 2003), insert page #

<sup>21</sup> U.S. Joint Chiefs of Staff , *Joint Capabilities and Integration Development System*, Chairman of the Joint Chiefs of Staff Instruction 3170.01G (Washington, DC: U.S. Joint Staff, March 1, 2009), B-1

<sup>22</sup> Eric Peltz, "*Equipment Sustainment Requirements for the Transforming Army*," 2003, [http://www.cgi.rand.org/pubs/monograph\\_reports/MR1577](http://www.cgi.rand.org/pubs/monograph_reports/MR1577), (accessed November 22, 2009), 59

<sup>23</sup> Levin, Carl, "Summary of the Weapon Systems Acquisition Reform Act of 2009," February 24, 2009, <http://levin.senate.gov/newsroom/release.cfm?id=308525>, (accessed February 22, 2009), 1

<sup>24</sup> Congress's authority to reorganize the defense acquisition process stems primarily from Article I, Section 8 of the Constitution, which vests the legislature with the power to "To raise and support Armies... provide and maintain a Navy... [and] make Rules for the Government and Regulation of the land and naval Forces."

<sup>25</sup> Eric Peltz, "*Equipment Sustainment Requirements for the Transforming Army*," 2003, [http://www.cgi.rand.org/pubs/monograph\\_reports/MR1577](http://www.cgi.rand.org/pubs/monograph_reports/MR1577), (accessed November 22, 2009), 60

<sup>26</sup> Defense Acquisition Performance Assessment (DAPA) report, March 2008, <http://www.acq.osd.mil/dapaproject>, (accessed December 11, 2009), 20

<sup>27</sup> Hantos, Peter. "Defense Acquisition Performance Assessment – The Life-Cycle Perspective of Selected Recommendations," *CrossTalk – The Journal of Defense Software Engineering*, May 2007, 28

<sup>28</sup> Neil Abercrombie, "Cost Overrun Reduction Needed," May 4, 2009, [http://www.rollcall.com/features/Defense-Aerospace\\_2009/defense\\_aerospace/34477-1.html](http://www.rollcall.com/features/Defense-Aerospace_2009/defense_aerospace/34477-1.html), (accessed November 14, 2009), 1

<sup>29</sup> James I. Finley, "Testimony of the Honorable James I. Finley, Deputy Under Secretary of Defense (Acquisition and Technology), before the U.S. House of Representatives Committee on Oversight and Government Reform and Subcommittee on National Security and Foreign Affairs," April 29, 2008, <http://www.dod.mil/dodgc/olc/docs/testFinley080429.pdf>, (accessed November 18, 2009), 5-8

<sup>30</sup> Hantos, Peter. "Defense Acquisition Performance Assessment – The Life-Cycle Perspective of Selected Recommendations," *CrossTalk – The Journal of Defense Software Engineering*, May 2007, 29



